THE MICROECONOMICS OF AGRICULTURAL DEVELOPMENT IN THE PHILIPPINES

by

James A. Roumasset

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1. **Myths, shibboleths, and irrational fears: how to bilk taxpayers and retard agricultural development**

Paul Krugman once remarked that a primary purpose of economics is to flush bad ideas but that, like New York cockroaches, the misconceptions keep coming back. This is nowhere more true than in discussions of agricultural development. In this section, we examine a few Philippine incarnations of some particularly resilient illogical-isms.

Many of the examples of flawed policy analysis regarding agricultural development are remarkably similar in structure. The argument begins with a stylized fact. An explanation of said fact is then provided that implies that the agricultural sector is inefficient. This is followed by a policy implication involving a government intervention designed to correct the errant behavior or institution. We shall show, however, that these interventions are risky schemes; if behavior and organization are already efficient, then said interventions will be "lose-lose" propositions; agricultural development will be impeded, and taxpayers will be billed for the result.

1.1 Rice and risk

It was once widely thought among Western development economists that the neoclassical assumption of rational, profit-maximizing behavior was inappropriate for low-income farmers in developing countries. They were said to be tradition-bound, ignorant of modern ways, and possibly indolent. This rather ethnocentric view changed gradually after the publication of Nobel laureate Theodore Schultz' book, *Transforming Traditional Agriculture*. Schultz argued persuasively that low-income farmers in developing countries were quite price-responsive and appeared to be "efficient but poor." As this new view caught on, and as the green revolution began to take off in the late '60s and early '70s, agricultural development economists struggled to reconcile the new belief in farmer rationality with the stylized fact that most farmers failed to adopt recommended practices associated with the high-yielding varieties of rice and wheat. The following theory emerged that reconciled this apparent paradox as follows:

> Low-income farmers are risk averse, i.e., they are more anxious to avoid low incomes than they are to attain high incomes.
>
> New technology associated with modern varieties of rice and wheat yields higher profits on average but is viewed by farmers as being more risky than traditional practices.
>
> Therefore, low income farmers are inhibited from adopting new technology.

Proponents of the risk-aversion-causes-under-investment (RAUI) theory drew the policy implication that crop insurance or critical inputs such as fertilizer should be subsidized in order to offset the inefficiency induced by risk aversion.[1] But the RAUI theory and its associated policy

[1] The RAUI hypothesis was introduced in a Philippines context by Wharton (1968). Despite ample theory and empirical evidence to the contrary, it remains popular to this day (see e.g. ADB, 1996).

implications involve several logical fallacies. First, the argument that the historical income levels of small farmers are barely above subsistence and that the consequences of lower incomes are especially severe (see e.g. Todaro, 2000) can easily be turned on its head. The very riskiness of agriculture and the many unfavorable conditions that small farmers face may mean that continuing traditional practices is highly likely to leave income beneath the threshold level, not above it. Such farmers may be faced with losing their land (or other assets) or subjecting their families to unacceptable levels-of-living and may be forced by their desperate circumstances to deliberately pursue risky strategies. Second, if risk is defined as the probability that farm income will fall below some critical threshold, there is no *a priori* reason that new technology is more risky than traditional technology.

Nonetheless, RAUI can be viewed as a plausible hypothesis suitable for empirical testing. When tested in the context of Philippine rice production (Roumasset, 1976), however, the RAUI hypothesis was rejected. Indeed, fertilizing rice at recommended levels was found to increase risk. What was overlooked by RAUI proponents was the possibility that fertilizer recommendations were too high. Fertilizer recommendations were appropriate for a small minority of farmers with good irrigation, ideal weather, and favorable economic conditions, but too high for the vast majority of farmers with idiosyncratically unfavorable conditions. Thus, the stylized fact that farmers failed to follow recommended practices is not evidence of inefficient behavior. Accordingly, the policy implications that follow from the presumption of inefficiency are unlikely to improve resource allocation and may be "lose-lose" propositions. That is, the subsidies will be costly to taxpayers and are likely to worsen economic efficiency to boot.

1.2 Modernization: the three nasties

Karl Marx and Friedrich Engels frightened generations of students by the prospect of "sheep eating men." By this they meant that the Enclosures of late 18th century England allowed rich landowners to disenfranchise peasants and adopt labor-saving methods of sheep-raising. Private property thus changed the agricultural sector from a social safety net for an expanding population to a net exporter of labor, and the "army of unemployed" in London was the inevitable result. In its generic form, the Neo Marxian view is that the institutions of capitalism destroy more egalitarian common property arrangements, exacerbate population pressure, and accelerate labor-saving technological change, resulting in proletarization and immizerization of the peasantry. Thus is the modernization triad -- commercialization, technological change, and population pressure -- rendered politically incorrect.

In the context of Philippine agriculture, this view was especially virulent during the 1970s and has never been entirely eradicated. The 1970's rice economy witnessed the coincidence of high adoption rates of HYVs (high-yielding varieties), a switch from primary dependence on family to hired labor, and a decline in real wages. This stylized fact was widely interpreted as follows. Population pressure set in motion Ricardian forces that began to polarize society into a class of wealthy operators of large commercial farms on the one hand and the rural proletariat on the other. This process was thought to be augmented by the advent of HYVs, which allegedly benefited owners of large commercial and irrigated farms. Small owner operators and tenants were thus placed at a relative disadvantage, and many were disenfranchised and converted into agricultural wage workers. Both the institutional and technical changes were

thus understood as being both inefficient and inequitable. Land reform was seen as a policy implication of the foregoing explanation.

The logical fallacy exemplified by the above is known as *post hoc ergo propter hoc*. It also illustrates a case of spurious correlation. The fact that wages apparently fell after, or in conjunction with, the adoption of new technology and the emergence of rural labor markets does not mean that falling wages were the result of those technological and institutional changes. An alternative perspective is provided by the theory of induced innovation (Binswanger and Ruttan). Instead of *ad hoc* theorizing, the theory of induced innovation looks to economics to provide a fundamental explanation of technical and institutional changes that are caused by changes in factor prices.[2] In this view, the green revolution is seen as a response to rising land rents occasioned by rapid population increase in the face of a constant or falling number of cultivated hectares (David). The high yielding varieties of rice were bred to accommodate an intensification of rice production in the form of higher labor and capital per hectare, e.g. more fertilizer, and more labor for planting, harvesting and especially for weeding. That is, the R&D that provided HYV's was induced by land scarcity and allowed an appropriate amount of agricultural intensification.

Figure 1 illustrates how the emergence of rural labor markets was similarly induced by land scarcity and the associated intensification of production. The graph represents a typical farm household in the province of Laguna and shows how four factors combined to increase hired labor dramatically. First, and most importantly, the intensification of production, ultimately caused by increasing land scarcity and accommodated by the new rice technology, increased the demand for labor per hectare. This is illustrated by the shift in the demand curve to the right. Secondly, increased farmer incomes resulted in increased schooling of farm children. This combined with the increased specialization among farm workers lowered the amount of farm-household labor per hectare. These higher opportunity costs and lower substitutability for skilled labor are illustrated by the shift in the labor supply curve to the right. Thirdly, the market wage went down (from W_{m0} to W_{m1}) as population growth, including in-migration, increased by more than enough to supply the increased labor demand. Fourthly, the transaction cost wedge between the market wage and the gross hiring wage decreased due to the advent of labor contractors and other new institutions of labor contracting (Roumasset and Uy). These third in fourth factors are illustrated by a downward shift in the gross hiring wage (from W_{h0} to W_{h1}). The combination of these four factors all reinforcing one another led to a tripling of hired labor in a mere 10 years, beginning in the late 1960s (Roumasset and Smith).

[2] A fundamental explanation (sometimes known as an "invisible hand explanation") specifies only behavioral postulates of the smallest units in the theory and characteristics of the solution. It does not introduce ad hoc assumptions about the behavior or nature of higher- level units (see, e.g. Nozick, 1975).

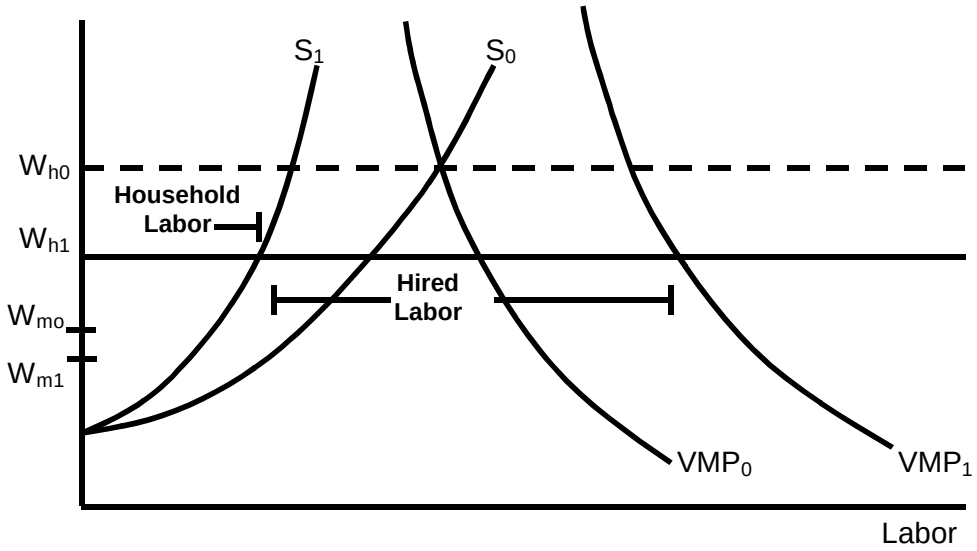


Figure 1: HYVs and the advent of labor markets

1.3 The panacea of land reform

There are two stylized facts about agricultural organization that are commonly used to justify land reform. The first is the inverse relationship between yield per hectare and farm size, which has been documented for both Latin America and Asia (see e.g., Todaro, 2000). The inverse relationship is said to be caused by dualism in agricultural labor markets. Large commercial farms hire labor only up to the point where the value of marginal product of labor equals the relatively high wage in the modern, commercial sector. Traditional family farms use more labor, pushing labor productivity down to the lower subsistence wage. This implies that the latter farms have higher yields per hectare. The policy implication is to take land from the large commercial farms and reallocate it to the subsistence sector by means of a farm-size ceiling/land-to-the-tiller reform program.

The above reasoning is competitive with the RAUI theory in committing the highest number of fallacies per sentence. First, the stylized fact has been misconstrued. The inverse relationship holds among family farms, not among commercial farms (Uy, 1979). The explanation based on labor market dualism between the modern and traditional sectors is irrelevant to the statistical pattern in question. Second, the theory is *ad hoc*. Inefficiency is implicit in the assumption of dualism; it is assumed, not derived. Third, there are at least two fundamental explanations of the stylized fact in question. If family farms rely primarily on household labor, which is roughly in fixed supply, then the quantity of land must be adjusted to the labor supply in order to equate the marginal products of labor across farms rather than the other way around. Since better quality farms will have greater labor productivity, efficiency requires that they be smaller. Accordingly better quality land will tend to be organized into smaller units, implying an inverse relationship between farm size and land quality (Roumasset in

Binswanger and Rosensweig, 1984). On the other hand, if family farms supplement household labor with hired labor and if the combined labor supervision and shirking costs ("agency costs") of hired labor are greater than that of household labor, agency costs per worker will increase with farm size because of the higher proportion of hired labor (Sah, 1986). Either or both of these explanations can account for the inverse relationship between yield per hectare and farm size. Since neither explanation implies inefficiency in agricultural organization, the inference that the inverse relationship between productivity and farm size is evidence of inefficiency does not logically follow.

Another stylized fact used to justify land reform in Asia is the high incidence of share tenancy in agriculture. Proponents of land reform tend to cite the risk-bearing theory of share tenancy (Stiglitz, 1974; Hayami and Otsuka, 1993) as its explanation. Share tenancy is said to mitigate both the labor-shirking disadvantage of wage contracts and the perverse risk-bearing of rent contracts. While share tenancy can thus be “pairwise-efficient” for the tenant and landlord, it has the Marshallian disincentive of requiring the tenant to fully bear the labor costs but only receive, say, 50 percent of the output. Accordingly, Stiglitz (1993) concludes that land reform which confers land ownership on former tenants would have the same output-enhancing effects as abolishing a 50-percent income tax.

Again, errors in observation and reasoning abound. First, the assumption that rent and share tenancy are alternative labor contracts to wage payments ignores the fact that share tenancy in the Philippines and elsewhere in Asia make most of the production decisions, supervise labor, and undertake hard-to-supervise tasks such as fertilization and pest control. Second, the implicit assumption that the costs of misallocated risk-bearing are commensurate with the costs of labor shirking, and are thereby consistent with the commonly-observed 50 percent landlord share, is unwarranted. Subsequent research based on Philippine conditions (Deweaver, 1998) has shown that if risk-bearing were the only disadvantage of rent contracts, landlord shares would only be approximately 10 percent. Third, Stiglitz's theory is not consistent with other stylized facts of tenure choice in agriculture. For example, it doesn't explain why landlord share is positively correlated with land quality and land rents relative to wages (e.g. as documented in Roumasset, 1984 and 1995). Similarly, the risk-bearing theory, which presumes that the landlord is wealthier and less risk averse than the tenant, is inconsistent with numerous instances “reverse tenancy,” wherein poor landowners lease land on a share basis to wealthier farmers (see e.g. Ray, 1998).

A more fruitful approach examines the nature of the agricultural firm. Farm-household farms range in extent of specialization from completely owner-operated farms, with no hired labor, to owner-managed farms, the labor for which is almost entirely hired. The two primary types of share tenancy contracts are intermediate along this spectrum. "Pure share-tenancy" contracts are commonly chosen on higher quality land on which there is a greater intensity of production. Landlords are commonly involved in management but specialize in making sure that the irrigation ditches and other farm improvements are properly maintained and in providing information, e.g. about new varieties and marketing opportunities. There is also considerable specialization regarding labor, both across tasks and in the tasks performed by hired labor versus those performed by farm household labor. In contrast, "lease-share" contracts are used on lower quality land and in conjunction with less production intensity, less hired labor, and less specialization. This observation can be generalized across the entire specialization spectrum. The higher are the preconditions for production intensity, including land quality, the greater the specialization that the chosen contract affords.

The specialization spectrum of agricultural firms just described was documented for the Philippines and Nepal and is well described by the hypothesis of efficient organization (Roumasset, 1995). Agency theory predicts that organizational forms will be chosen so as to maximize profits net of transaction costs, or equivalently to minimize agency costs. When the intensity of production warrants a more specialized mode of production, residual profits tend to be awarded to that factor which is hardest to monitor (see also Hart, 1995). In the case of the owner-managed farms, the residual goes to the manager -- labor is paid with wages. In pure share tenancy contracts, the share tenant receives a share of the residual for his day-to-day production decisions and his hard-to-monitor labor inputs. The landlord receives the remaining residual to incentivize him to provide for land maintenance and in compensation for incidental contributions to management. Where not much specialization is warranted, the residual can be used to incentivize labor, as it is in owner-operator firms and in lease-share arrangements.

In summary, the case for inefficiency in agriculture and the corresponding case for input subsidies, land reform, and other interferences with property rights, freedom of contracting, and markets is very weak. Rather than risk scarce tax revenues or accelerate inflation with deficit spending in the name of distorting agricultural markets, a more prudent strategy for getting agriculture moving is to promulgate policies, programs, and projects which do not depend on the inefficiency of agriculture for their success.

1.4 Other misconceptions and quick fix solutions

Other misconceptions and derivative interventionist schemes are pervasive enough to warrant mention. Among them is the proposition that farmers are rational but *constrained* by a variety of factors beyond their control. Farmers are said not to adopt recommended practices for example because they are constrained, not only by risk aversion but by a lack of credit, irrigation, knowledge and even good weather. Such observations are followed, as the night upon the day, by recommendations for government to provide the perceived missing ingredient. (I have not heard this said about the weather, but that is perhaps just a matter of time.) The constraint mentality overlooks the enormous diversity of Philippine agriculture. Farmers (and their farms) differ by economic circumstances, market environment, climate, soil, topography, irrigation, and economic and agro-physical characteristics. Behavioral models that take these differences into account have relatively high explanatory power (e.g. Roumasset, 1976; Roumasset and Thapa, 1983).

A “constraint” that received particular interest in the late 1990’s was the observation that soil productivity was suffering from a secular decline, due to too many years of multiple rice crops with heavy doses of fertilizer and other chemicals. This inference was used in turn to justify agricultural price supports (e.g. ADB, 1996; 1998). But the conclusion in question derived from a fallacy of composition. The data showing declining soil productivity came from scientifically-controlled studies at the International Rice Research Institute. The data on declining yields came from the farmers’ fields, gathered by the Bureau of Agricultural Statistics, and was not so controlled. Several other explanations of declining yields are possible, among them the reduction of inputs and the depletion of potassium and phosphorous caused by the common practice of stinting those fertilizer components in favor of nitrogen. That is, there is no basis for concluding that declining yields in the 1990s resulted from anything beyond the farmers’ control.

The *constraints* view is sometimes partnered with the *consequences* mentality, according to which various aspects of new agricultural technology can be evaluated according to whether they have good or bad effects and subsidized or taxed accordingly. A well-known example of this was

a study of mechanization in South Asia, wherein the author regressed yield per hectare and labor per hectare on an indicator of mechanization (Binswanger, 1978). Such *misplaced exogeneity* runs counter to the theory of induced innovation. An alternative theory that farmers chose mechanization levels that maximized their expected profits explained 91% of the variation in an index of mechanization (Roumasset and Thapa, 1983).

1.5 Policies that do not depend on the inefficiency of agriculture: the legacies of Adam Smith, and Theodore Schultz

Paraphrasing Adam Smith, the role of government in the economy is to provide security, a legal infrastructure for economic cooperation, and physical infrastructure. The function of said social infrastructure is both to facilitate markets, which in turn facilitate specialization and exhange, and to shift out the production possibility frontier. In the agricultural context, social infrastructure would include property rights, farm to market roads, and irrigation facilities where warranted. Theodore Schultz added publicly-funded agricultural research and development to the list as well as meaningful farmer education and extension.

2. Property rights, contracts and markets: the legacies of Smith and Ronald Coase

Politicians, and many academics, have the incurable disease of top-down ism. They are forever designing rules, regulations, and institutions to be coercively imposed on the economy. For example, despite decades of failed land reform legislation that have resulted in untold waste,[3] the land reform effort continues in the Philippines to this day. The palliative for top-down tinkering with institutional design is an understanding of institutional choice and evolution. More specifically, we need a theory of how agricultural organization in the Philippines evolved from a self-sufficient peasant economy to a more specialized and intensive market economy. This will afford an understanding of how government policy can either facilitate or stagnate the evolution.

Lacking appropriate data on the evolution of agricultural organization before the 20th century, we begin with a stylized history of agricultural organization in the recently settled province of Palawan.[4] Settlement of Palawan has been described as occurring in three waves. The first wave of pioneer settlers brought with them sufficient equipment, funds, and skills to clear and begin farming a piece of land. As they subsequently began raising families and expanding their holdings, they also contracted with the second wave of settlers who brought less capital but borrowed land instead from the pioneers. After a period of typically three years, they returned the pioneers' lands, along with the "interest" of land improvements. By this time, they had cleared their own homesteads. The third wave of immigrants brought less capital still and contracted themselves out as share tenants to previous settlers. In typically five years time, they too were able to begin farming their own homesteads. As population grew, specialization increased. More crops and other products became available and off-farm services, such as marketing and money-lending began to appear. This facilitated the classic scale-economies of Adam Smith (and developed further by Young, 1928; Yang and Borland, 1991; and Yang and Ng, 1993). Generalized to the aggregate level, this also helps to explain one of the stylized facts of David (1971), that even during the extensive period of agricultural development (up to the mid-sixties), agricultural yields per hectare increased. The internal and external economies of scale permitted the average product of labor and per capita incomes to rise, as shown in stage I of

[3] Hayami et. al., 1990; Briones, 2000.
[4] See James and Roumasset, 1984, for details.

figure 2. To the extent that internal economies associated with increasing division of labor were responsible for the rising average product of labor in recently settled regions, marginal product pricing was infeasible (Day, 1975). This provides another reason why hired labor was not observed.

As the "land frontier," i.e. the fertile-land constraint, was reached in most of the Philippines during the mid-1960's, cultivated hectarage ceased to grow, and aggregate yield increases came from Ricardian intensification (David, 1971). This rendered marginal product pricing feasible, affording a *fundamental transformation* to decentralized decision-making and allowing economic organization by markets. As population pressure continued to build up against the land constraint, wages relative to implicit rents fell, inducing land-saving innovations including more intensive land preparation, increased cropping intensities, organic and chemical fertilization, and the technological and institutional changes discussed in section 1.2.

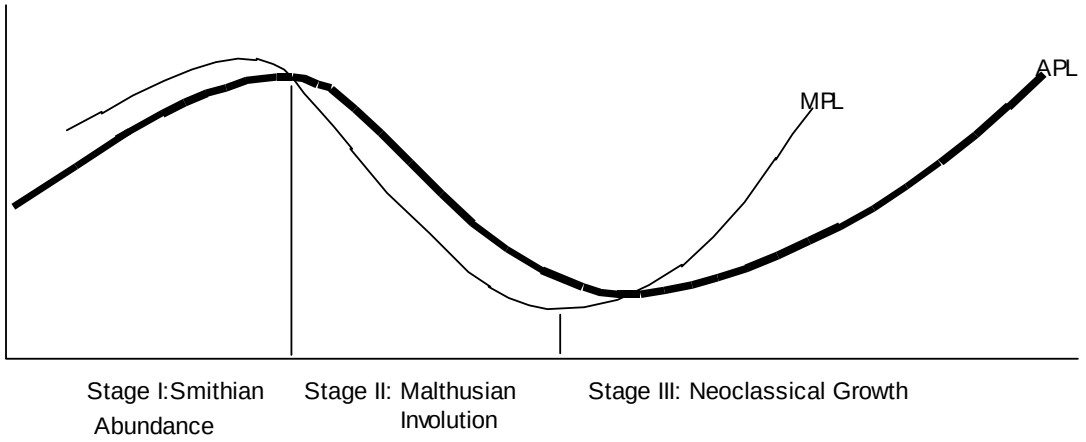


Figure 2 Stages of Institutional Evolution

This Malthusian stage of agricultural development lasted from the late 60's through approximately 1977. To the extent that changes in the mode of production accommodated increased labor intensity, they were consistent with both induced innovation and what Geertz (1966) called "agricultural involution." They mitigated the downward pressure on wages, but did not reverse it.

How then does an economy escape from the dismal fate of a Malthusian trap? The answer lies in Smithian external economies of specialization (Yang et. al. as above) and what are known as "Boserup effects." Esther Boserup (1965, 1981, 1987) described how growth induces an increase in cropping intensity, in turn fostering changes in economic organization and the non-agricultural economy that may have the combined effect of increasing labor productivity.[5]

In the Philippine context, both the Palawan settlement story and the example of hired labor in Laguna exemplify vertical division of labor that facilitates specialization between the

[5] (See Krautkramer, 1994, for a formal model of how population growth can induce labor-productivity-enhancing increases in cropping intensity.)

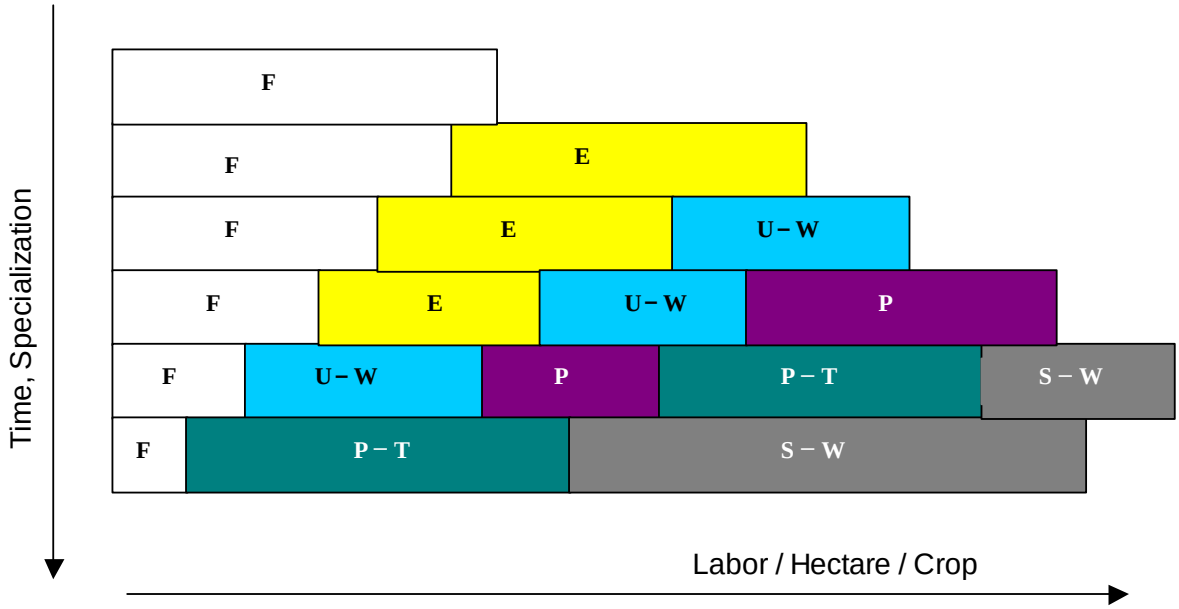
arduous labor tasks and the more management-intensive ones. Another example is the subcontracting by tenants to "gama" workers, who do harvesting/threshing and weeding in return for one sixth of the harvest (Roumasset, 1978). Hayami and Kikuchi (1982) refer to this process of increasing vertical specialization as "stratification."

Horizontal division of labor also increased throughout the 70's and 80's. For example, the traditional method of using undifferentiated village labor for transplanting and harvesting was replaced by hiring different individuals for different tasks. Specialized laborers performed their tasks with greater skill. Teams of highly skilled men would go from village to village, transplanting in the new straight row method. This exemplifies the classic Smithian external economy associated with the proposition that specialization is limited by the extent of the market. Rather than the division of labor being achieved inside the firm, farm-households began purchasing transplanting as an intermediate product. Indeed a piece-rate contract was made with the team leader who "delivered" the transformation from an unplanted to a planted field (Roumasset and Uy, 1980). The division of labor afforded by the increase in the number of goods is what facilitated learning-by-doing.

Economies of specialization, Boserup effects, exogenous technological change, capital formation, and/or a declining agricultural labor force (due e.g., to an expansion of the non-agricultural sector) may overcome diminishing returns to population growth and cause the marginal product of labor to rise, thus beginning stage three, the period of labor-saving, capital-using technical change. Agriculture in some parts of the Philippines entered this stage of development during the late 1970s. In Laguna, the increase in real wages induced labor-saving mechanization in rice production. By the end of the decade, more than three-fourths of the farmers used mechanized methods of harrowing and threshing, and slightly more than half used mechanized plowing. Accordingly, labor per hectare decreased, even as yields continued to rise (Roumasset and Smith, 1981).

When economic development faltered during the latter years of the Marcos administration and throughout the Aquino years, the mechanization trend also stagnated, though it did not reverse. This can be understood as a consequence of further improvements in the design of agricultural machinery, and the fixed set-up costs associated with new skills and institutions of agricultural organization. The trend in mechanization and the decline in manhours per hectare per season resumed during the Ramos administration.

The horizontal division of labor that had begun in the land-saving stage continued in the late 70s and throughout the 80s. Figure 3 provides a stylized evolutionary-pattern of labor contracts in Laguna. During stage I, labor was provided by the farm household and exchange arrangements with residents in the same village. During stage II, the next three rows of figure 3, hired labor emerged. At first labor was hired on a wage basis, and the workers were not differentiated with respect to task. As horizontal specialization increased, piece rate workers were hired for selected tasks (those which were relatively easy to monitor) and undifferentiated wage labor declined. The third phase of stage II saw a further decrease in undifferentiated wage labor, a decline in individually-hired piece workers, and the advent of two new contracts. In "piece-rate with team labor," the contract was made with a labor contractor who also served as team leader and supervisor. The other new form was for skilled laborers who specialized in particular tasks and were paid in wages. These new forms came to dominate the other forms of hired labor in stage III. Piece rate with teams continued to replace individual piece-rate contracts, and specialized wage labor replaced undifferentiated wage labor and most of household labor.



Notation:

F: Family labor
E: Exchange labor
U – W: Undifferentiated wage labor
P: Piece rate labor
P – T: Piece rate with team labor
S – W: Specialized wage labor

Figure 3: Evolution of Labor Contracts

The explanation of the above dynamic pattern of labor contracts is similar to the agency theory explanation of the spectrum of agricultural firms described above in section 1.3. In both cases, the objective is to explain a spectrum of contracts ranked according to specialization. In the cross-section case, the same preconditions for production intensity (e.g. land quality) also predispose a more specialized organizational form. As the profit maximizing level of inputs increases, more production management is warranted, indicating an organizational form wherein the manager is rewarded with a larger share of the residual. That is, the agency costs associated with shirking of non-labor inputs increase, moving towards better quality land, and those costs are best economized by supervising labor and incentivizing managers (Roumasset, 1995).

Figure 4 illustrates an analogous explanation of the dynamic specialization-spectrum of labor contracts. Transaction cost is defined in a way that is consistent with the proposition that economic organization evolves so as to minimize transaction costs (see e.g. Williamson, 1986, and North), i.e. in its most inclusive form. That is, agency costs are the sum of transaction expenditures that improve the quality of information and enforcement (e.g. monitoring and bonding ala Jensen and Meckling, 1976). In order to generalize the concept of agency costs,

which are internal to the firm, to the entire economy, we may define transaction costs as the sum of agency costs and foregone gains from specialization, i.e. the difference between real income associated with a particular economic organization and that which is possible in the first-best solution with complete specialization.[6] As illustrated in the figure, undifferentiated wage labor is dominant at low levels of specialization, and piece rate with teams is dominant at high levels of specialization. This is because the agency costs of wage contracts are low but steep at low specialization levels, due to the ineffectiveness of higher supervision expenditures. When each of the agency cost curves is added to the same decreasing cost of foregone specialization curve, we get the envelope illustrated. Since the more specialized forms of labor organization require higher set up costs, there is the potential for induced institutional change to generate growth (see e.g. Borland and Yang, 1992).

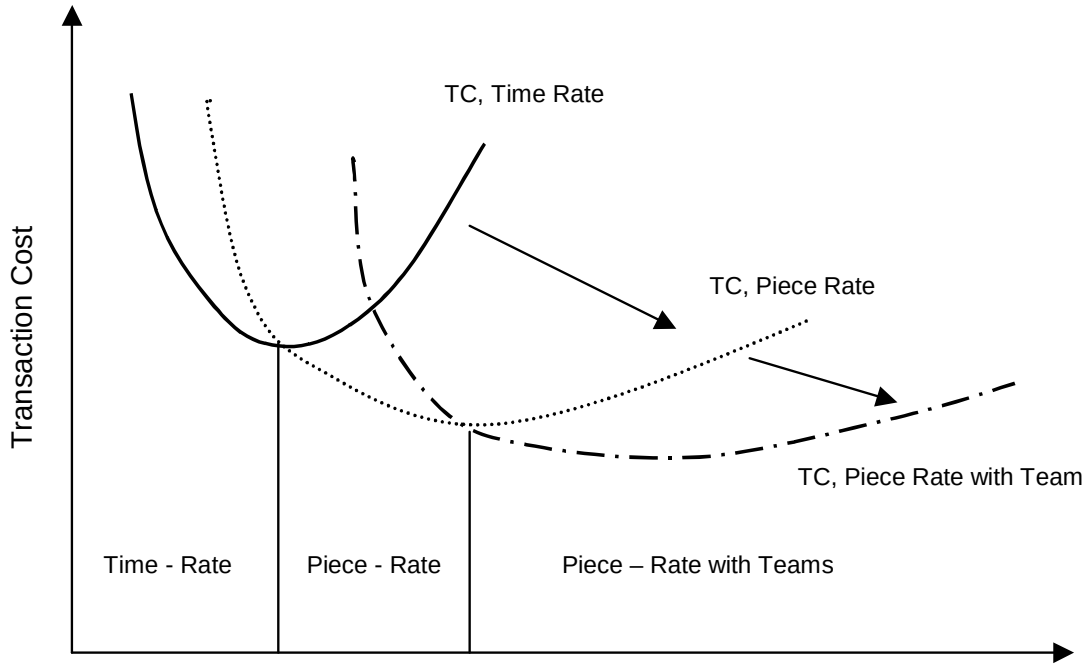


Figure 4: Efficiency Explanation of Labor Contract Evolution

Integrating this evolutionary perspective back with the comparison of firms, we see that as population density increases and transaction cost wedges fall, e.g. per unit transportation costs, production intensity and warranted specialization increase, inducing an increase in hired labor and a more complex organizational form. The set of labor contracts for each firm also becomes more complex, e.g. adding another layer between the employer and the employee and having separate contracts for separate tasks. Thus agricultural organization in the Philippines is not standing at an

[6] That is, what Adam Smith called a nations' wealth at the full complement of its resources.

arbitrary "crossroads" between stratification and polarization, as proposed by Hayami and Kikuchi (1982), it is rather at the crossroads of increasing complexity, specialization, and growth, as warranted by efficient modernization, or stagnation, as caused by the forces of rent-seeking and the unintended consequences of excessive intervention and controls. Nor are individual stuck in a particular stratum. As dramatized by the Palawan example, increasing layers of economic organization afford a smoother climb up the agricultural ladder. The following section illustrates one particularly pernicious example of market-impeding intervention.

3. Food security

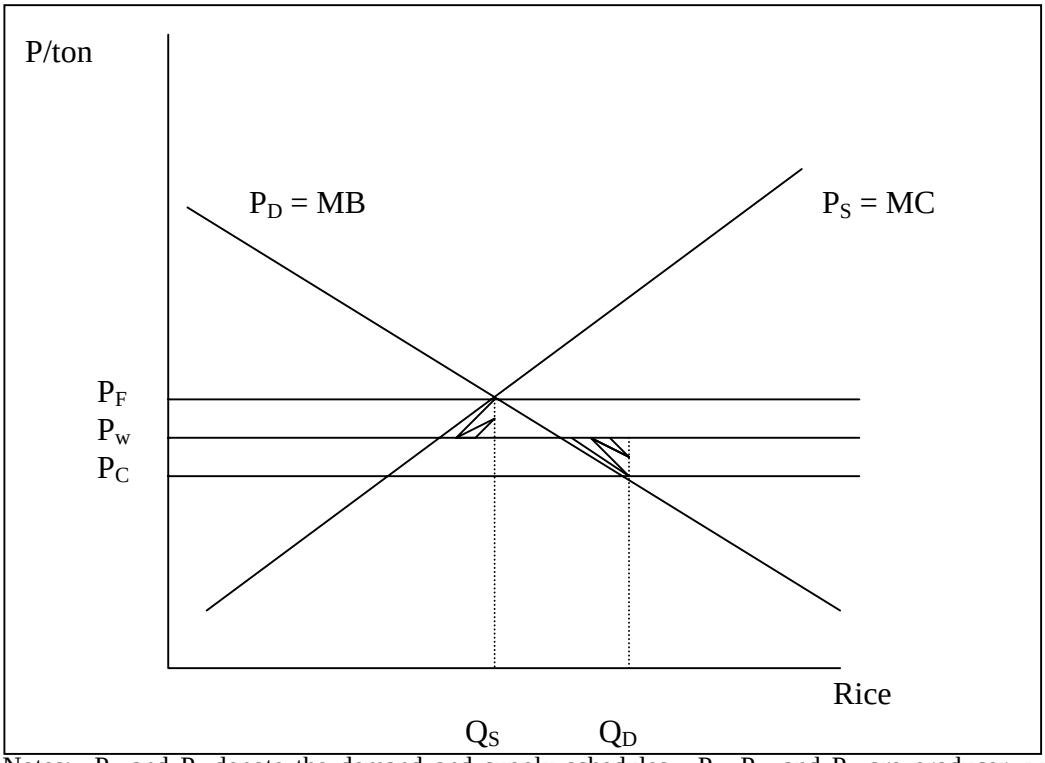
The quest for food security in the Philippines contains many lessons about the unintended costs and consequences of government intervention. The following discussion, like the ongoing debate in the Philippines, centers on rice.

The first lesson is that a coherent and effective policy cannot be designed if the objectives that the policy is meant to achieve are themselves ambiguous and inconsistent. The meaning of food security and the objectives of rice policy in the Philippines generally have been defined to include low and stable prices to consumers, sufficiently high and stable prices to producers, agricultural modernization, and sustainable poverty reduction. Figure 1 illustrates why simultaneously pursuing just two of those policies – decreasing consumer prices while increasing producer prices – would be massively inefficient and politically infeasible.

In order to maintain farm prices above world prices, the government must pay producers a subsidy equal to the difference between producer and world prices (P_F - $P_{W)}$ times the domestic production, Q_S. This results in an excess burden equal to the upper shaded triangle plus the subsidy times the marginal social cost of public finance. The latter measures the tax friction associated with financing the subsidy payments through inevitably distortionary taxation (the marginal cost of public finance is typically assumed to be in the neighborhood of 1.3 – 1.4[7]). Lowering consumer prices requires similarly subsidizing consumers by the amount, P_W - P_C, times the entire amount Q_D plus an even larger amount due to tax friction. Such programs would be extremely costly and politically infeasible to maintain, due to the large increase in the implied tax burden.

[7] See Browning as cited in Kolstad, *Environmental Economics*, 2000.

FIGURE 5: EXCESS BURDEN OF PRICE CONTROLS



Notes: P_D and P_S denote the demand and supply schedules. P_F, P_W and P_C are producer, world, and consumer prices respectively. Q_S and Q_D are the quantities domestically supplied and demanded, respectively.

Since it is fiscally impossible to subsidize all buyers and sellers, the government must implicitly compromise its ostensible objectives. One inevitable compromise is that insufficient funds and operational facilities will be allocated for the subsidy of all producers and consumers. Some will accordingly be afforded special treatment and the allocation of said favors will attract rent-seeking behavior. Another compromise is that one of the goals, either low consumer prices or high prices, will be sacrificed for the other. Judging by the actions of the National Food Administration in the Philippines, it may appear that priority has historically been given to urban consumers, inasmuch as releases in urban areas far outstrip procurment from farmers. But this overlooks NFA's marketing monopoly regarding exportation and importation of rice and the government subsidy paid to finance NFA. The following suggests that the costs imposed by NFA operations on the Philippine economy far outweigh the direct costs to rice producers and consumers.

3.1 The Economic Cost of NFA

Figure 1 showed the economic waste that would be generated if NFA were able to pursue its ostensible goals of raising producer prices and lowering consumer prices. As shown elsewhere (Roumasset, 2000), however, the actual effects of NFA policy have been quite different. Consumers pay prices that are 35-100% higher than would be possible under free trade. This is primarily due to the import ban and to the fact that NFA imports and releases fail to make up for what would be achieved by private traders. Moreover, this "protection" against foreign imports does not confer commensurate benefits on Filipino farmers.

The combined cost to rice consumers, farmers, and Philippine taxpayers of these distortions is illustrated in figure 5, based on production, consumption, and price estimates for 1999. Production is estimated at 7 million tons at a producer price of 14.5 pesos/kg (including the conversion of palay to rice and marketing costs up to the wholesale *in situ* warehouse point). Consumption is at 7.8 million tons, corresponding to a consumer price of 18 pesos/kg, which is 64% above the border price of 11 pesos/kg. If this protection were achieved by an import quota of 0.8 million tons, the resulting equilibrium domestic price would be 15.63 pesos/kg, with both rice consumers and "producers" (including the marketing sector) facing the same domestic price. In actuality, consumers are paying substantially more and producers receiving somewhat less. This wedge between consumer and full-producer prices is due to inefficiencies and non-competitive elements in rice marketing that result from current government policies. The consumer price, at least before the 1999 wet season harvest, was in the neighborhood of 18 pesos. But the producer price, marked up according to efficient margins was approximately 14.5 pesos. This result could have been obtained by a combination of a tariff sufficient to limit imports to .8 million tons (resulting in the domestic price of 15.63 pesos) and consumer and producer taxes sufficient to further raise and lower the consumer and producer prices respectively. The cost to the taxpayers of failing to obtain these revenues is 3.7 billion pesos in foregone tariff revenues, 18.49 billion in foregone consumer tax revenues, and 7.91 billion in foregone producer tax revenue, for a combined total of 30.1 billion pesos. Since taxpayers are therefore paying 30 billion worth of taxes unnecessarily, and since those taxes impose roughly 30% of the tax revenue in deadweight loss (due to the distorted incentives imposed by distortionary taxes), this implies an additional 9 billion pesos in losses. To this, one can add the excess burden of unnecessarily high marginal production costs and the consumer benefits denied by restricting imports. Adding these amounts of excess burden (see figure 5 and the accompanying notes) to the costs just described gives a total estimated cost of almost 49 billion pesos.

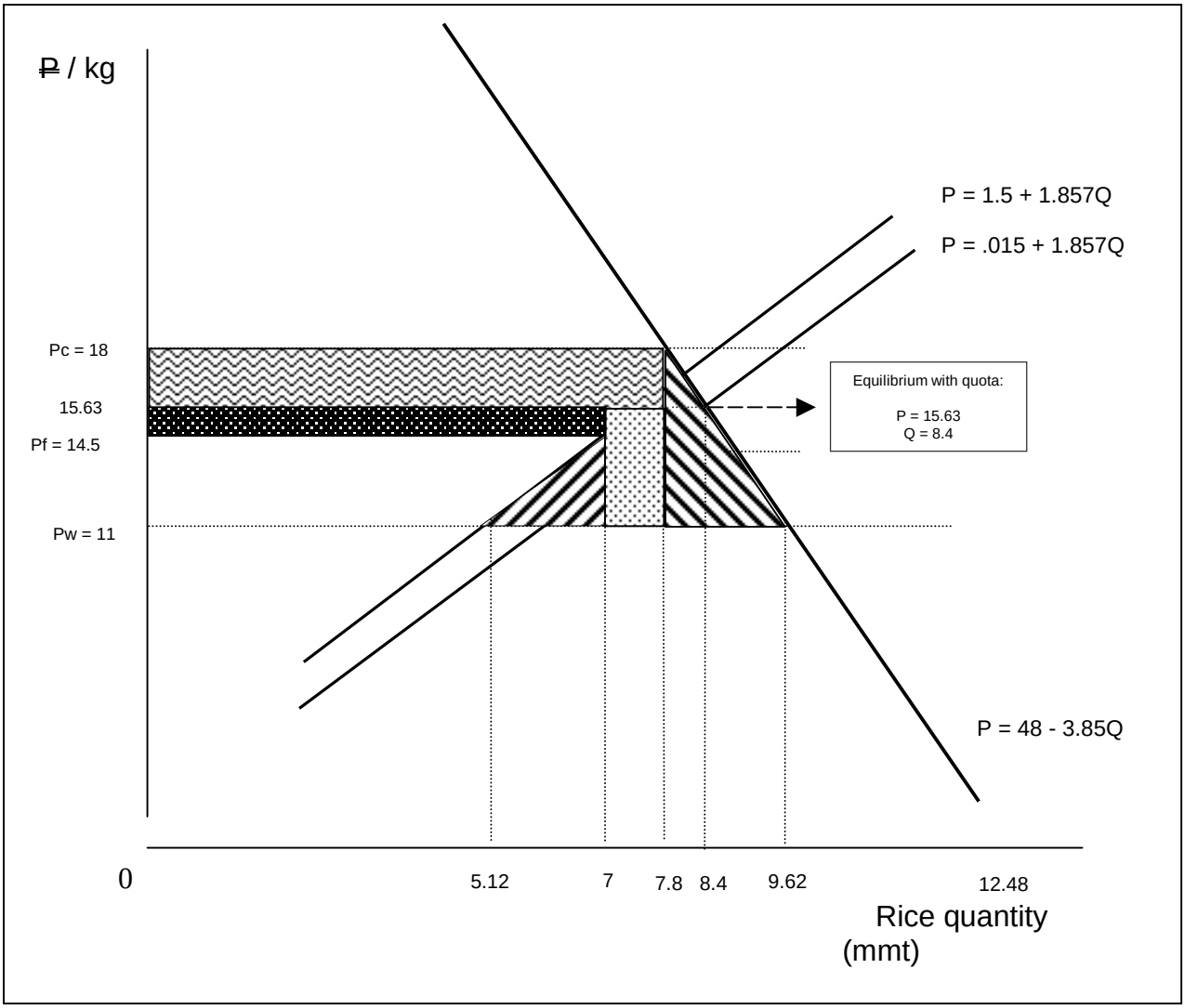
But instead of taxpayers gaining from NFA operations, they in fact were losing. The cost to taxpayers includes not only the budget subsidies paid to NFA, but the increase in debt (which obligates future tax payments) and the infusions of new government equity. From this must be subtracted the value of new assets. Table 6 shows that the financial subsidies to NFA for 1998 appear to have been in excess of 6 billion pesos even valuing the increase in rice stocks at almost 4 billion pesos.[8] Even if the financial subsidies for 1999 turn out to be roughly half of what they were in 1998, that still leaves a total cost of rice policy equal to almost 52 billion pesos.

For some years the total cost of Philippine rice policy was higher and in some cases lower than in the scenario for 1999 as estimated above. To calculate the total costs for other years, one simply needs to apply the same methodology as illustrated for 1999. Note however that the average implicit tariff for 1995-1998 was 78%, whereas that assumed for the 1999 estimate was only 64%. To the extent that the implicit tariff dominates in the calculation of total cost, this suggests that the 1999 estimate is not above average.[9]

[8] Other newly acquired assets were not included. While net investment (minus depreciation) would normally be subtracted along with increased inventories, such assets should be valued according to their social utility, which has already been seen as negative or zero.

[9] The exception was 1998, when the implicit tariff was half of the assumed level for 1999, implying lower excess burden and foregone producer and consumer tax totals. But foregone tariff revenue was much higher (22 billion pesos), partially offsetting those reductions (Roumasset, 2000).

FIGURE 6: EXCESS BURDEN OF PRICE CONTROLS, 1999



Notes:

	Foregone Tariff Revenues = ₱ (15.63-11) /kgs. x (7.8-7) billion kgs.	= ₱ 3.70 Billion
	Foregone Consumer Tax Revenues = ₱ (18-15.63) /kgs. x (7.8) billion kgs.	= ₱ 18.49 Billion
	Foregone Producer Tax Revenues = ₱ (15.63-14.5) /kgs. x (7) billion kgs.	= ₱ 7.91 Billion
	Tax Friction = 0.3 ₱ (3.70 + 18.49 + 7.91) billion	= ₱ 9.03 Billion
	Excess Burden for consumer = (1/2) x ₱ (18 –11) /kgs. x (9.62 –7.8) billion kgs.	= ₱ 6.37 Billion
	Excess Burden for producer = (1/2) x ₱ (14.5-11) /kgs. x (7-5.12) Billion kgs	= ₱ 3.29 Billion
	Total Cost of Rice Policy not including the financial subsidies to NFA	**= ₱ 48.79 Billion**

Demand as function of price: Q = 12.48 – 0.26P

Supply as function of price: Q = .54P - .81

Table 1: Financial Costs of NFA Operations (1998)

Operational Subsidy (Budget)	₱ 1.22 B
Equity Infusion	₱ 0.17 B
Increase in Debt	₱ 8.78 B
Less: Increase Value of Rice Stocks	₱ -3.89 B
Total	₱ 6.28 Billion

Apparently then, NFA raises consumer prices and implicitly taxes farmers, all at a large financial cost to Philippine taxpayers. In other words, the benefits of NFA's rice program are negative and its costs are high. How can such a wasteful program persist? The answer lies in the realm of political economy. The harm that government intervention causes is not readily apparent. Indeed the present rice and food security policies appear to some to be helping consumers and producers, who are unaware that they would be better off under free trade. Neither they nor the taxpayers are therefore motivated to seek reforms.

Meanwhile the present rice policy is potentially very lucrative for well-connected rice traders and political insiders. A NPR of 78% means that importation can potentially earn 78% profit above costs reckoned up to the wholesale warehouse. To what extent these potential profits are actually realized by particular individuals or wasted through inefficiency is unknown. More specifically, the following categories must sum up to the total potential profits (roughly, e.g. 78% times net[10] imports).

1. Unnecessarily high commissions paid to import-brokers.
2. Bribes paid by rice traders and/or wasteful lobbying/favor-currying to obtain import rights.
3. Government-to-government contracts whereby the Philippine government contracts to buy low-quality rice at high market prices, permitting pertinent parties to pocket the prize.
4. High-profits extracted by importers and wholesalers (above their legal and illicit payments for import rights and lobbying expenses).
5. High-profits extracted by cartelized retailers.
6. Other unnecessary costs due to inefficiencies in marketing and distribution.

[10] The small import quota that is auctioned off should be subtracted from total imports.

It is not necessary to apportion potential profits across the six categories. Indeed one or more of them may be negligible in the Philippine context. The point is that all of them represent losses to taxpayers, rice consumers, and producers.

The reason that the above estimates of waste are so much higher than commonly estimated is that conventional analysis implicitly omits many of the categories of waste included here. Most notably perhaps, conventional analysis assumes that, absent a tax or other policy that explicitly drives a wedge between producer and consumer prices, those prices must be the same. There are two reasons why this oversimplifies the actual situation. First, government intervention blunts incentives for private investment in efficient storage and transportation equipment. Second, government policies decrease entry and competition in the marketing industry. Both of these effects increase the wedge between producer and consumer prices above what is efficient. An even more fundamental oversimplification regards the conventional assumption that the domestic economy is entirely integrated. Even with perfect markets, however, equilibrium prices differ over space and time and some degree of market fragmentation is to be expected.[11] When a state trading enterprise intervenes with grain aquisition and release decisions, transportation and storage costs differ from and exceed those in the efficient market solution, and excess burden exceeds that calculated by the conventional method (Kratz and Roumasset, 2000).

We also assume that the rents created by the spread in producer and consumer prices is economic waste. The conventional justification for this assumption is that rents are "dissipated" by lobbying and related costs incurred in their competitive pursuit (Krueger, 1974). In the Philippine context, some part of the rents may appear to be transfers, i.e., they are captured by political insiders. Even these rents are dissipated in a larger sense; they are spent on conspicuous consumption produced in other countries, placed in secret Swiss bank accounts, and so on. Moreover, a good part of the rent rectangles in question is simply wasted through the inefficient marketing operations described above.

3.2 Stabilization policy

Among the many "market failures" and alleged justifications for government intervention, perhaps the most misunderstood concerns stabilization policy. One of the common justifications of a state trading enterprise to control the Philippine rice market is that without government control, market prices would be unacceptably volatile. It is surprising how readily this justification is accepted without a compelling rationale that governments can and should control prices.

The case for government stabilization of prices is weak at best. If the source of domestic price instability is international price variability, even costless stabilization would be welfare reducing. Consumers gain more from low prices than they lose from high prices. The reverse is true for producers. If domestic supply were the source of unstable domestic prices, price stabilization via a costless buffer stocking scheme would be welfare increasing, but of course no

[11] The Kuhn-Tucker condition for spatially efficient markets is that each pair of regions either trades, and regional prices differ by the transportation cost between regions, or they don't trade, and prices differ by less than the transportation cost. The analogous condition for temportally efficient markets is that either storage takes place from one period to the next and prices differ by storage costs or storage doesn't take place and the price in the second period is less than that of the first plus storage cost (see Kratz and Roumasset, 2000 for the theory of spatial and intertemporal equilibrium with an illustration based on the Philippine rice market).

such free lunch exists. Feasible acquisition and release strategies are likely to be welfare reducing when they work, due to the limited degree of stabilization and high costs. Moreover, empirical evidence from the Philippines suggests that attempts to stabilize grain prices do not work (Roumasset, 2000), and theoretical analysis shows that stabilization strategies involving buffer stocks tend to be destabilizing in the long run, due to the probability that stocks, storage capacity, or available budgets will eventually be exhausted (Williams and Wright, 1991).

The best stabilization program for the Philippines would be to abolish the state monopoly on international trade in rice and government-imposed barriers to entry. This policy would not only render the industry competitive, but it would create a rapid-response capability to import in times of unexpectedly high domestic prices by removing the elaborate contracting, procurement, bidding, and other administrative requirements that presently delay government purchases. This would not necessarily require the complete abolition of NFA, but it would imply a dramatic reduction in the scope and size of the state-trading enterprise. Government procurement of domestic supply should be decreased further than it already is, e.g. from 1% of supply to 0.5% or less, and limited to areas where monopsonistic buyers have apparently reduced buying prices below their competitive levels.

It may also be appropriate for government to assure the maintenance of a small strategic reserve for emergency purposes. But a maximum size should be established for the strategic reserve based on the conceivable number of regions that could be in deficit at the same time, the availability of rice in the local market, and the minimum delivery time of foreign-sourced grain. It is difficult to imagine how such considerations could justify more than 15 times the daily consumption rate. There is no way, however, to justify the NFA imports and storage decisions which led to inventories as much as 120 days worth of consumption during 1999.

If price stabilization is thought to be politically necessary, however, the key is to stabilize prices within an appropriate band at the least possible cost. Buffer stocks are theoretically incapable of price stabilization and have empirically been found to be ineffective (Williams and Wright, 1991; Roumasset, 2000). Rather, domestic prices can be stabilized by varying imports, even if world prices themselves fluctuate. One such scheme is variable import quotas. The regulator first calculates a target price by means of a simple linear function that maps a broad band of feasible world prices into a narrower band representing acceptable domestic price fluctuation and then auctions off the import quota necessary to achieve that price.[12]

4. Conclusion

Economic cooperation among individuals seeking mutually beneficial arrangements carries the seeds of abundance. Beginning with simple contracts, economic organization allows specialization, which in turn induces growth. Thus an economy can become ever more complex and interdependent, yet robust, and continually grow. The role of government is to facilitate cooperation with the appropriate legal and physical infrastructures, including the means of knowledge generation. Top down schemes that replace other economic functions may impede the natural evolution of economic organization, resulting in stagnation and the dismal state of poverty that neo-Maltusians continue to fear.

[12] For details on this and other possible stabilization schemes, see Clarete, 1999 and Roumasset, 1999.

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